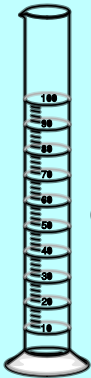


# Chapter One

## Data Management



**Data Management:** an effective way to collect, organize, represent, display and analyze data.

Ex: Sports, Medicine, farming, etc...



## 1.1 Variables and Relationships

Curriculum Outcomes	Related Activities	Page in Text
<ul style="list-style-type: none"><li>gather data, plot the data using appropriate scales, and demonstrate an understanding of independent and dependent variables, domain, and range (pages 2, 3)</li></ul>	<ul style="list-style-type: none"><li>identify the factors (variables) that interact to affect tree growth</li></ul>	2
	<ul style="list-style-type: none"><li>identify independent and dependent variables in the relationships and discuss which variables can be controlled</li></ul>	3
<ul style="list-style-type: none"><li>design and conduct experiments using statistical methods and scientific inquiry</li></ul>	<ul style="list-style-type: none"><li>design and carry out experiments and organize data that demonstrates the effect of controlling all but one independent variable in an investigation</li></ul>	4
<ul style="list-style-type: none"><li>solve problems by modeling real-world phenomena</li></ul>	<ul style="list-style-type: none"><li>represent the relationship using a mind map</li></ul>	6

## NOTES

### Cause-and-effect relationships

- When a change to one variable causes a change in another variable.

**Variables**: any measured quantity that changes in an experiment or relationship.

**There are three types of variables:**

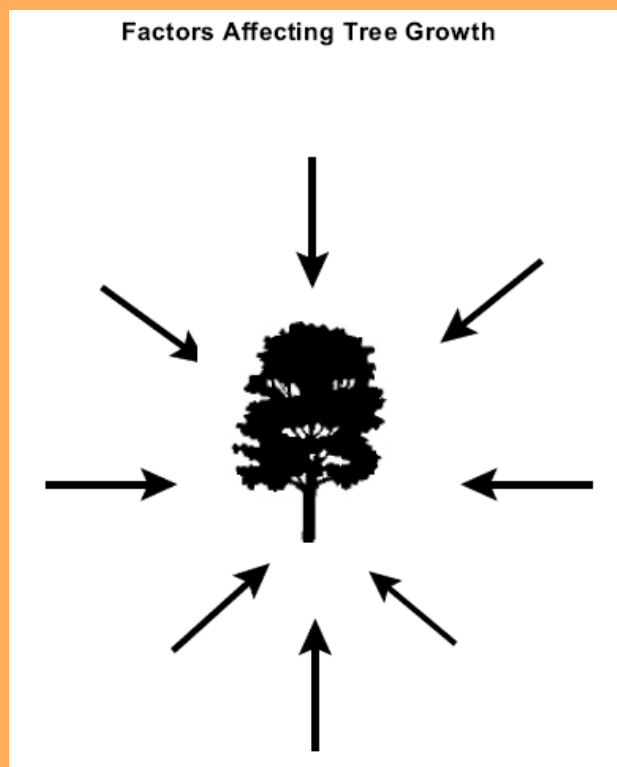
1) **independent variable**: a factor or factors that affect another factor in an experiment or relationship, it is the cause which affects an outcome. Ex: rainfall, vehicle traffic, etc.

2) **dependant variable**: is the factor that is affected by other factors in an experiment or relationship, it is the effect which occurs after particular factors are presented Ex: the amount of tree growth.

3) **controlled variable**: any independent variable whose value is held constant during an experiment.

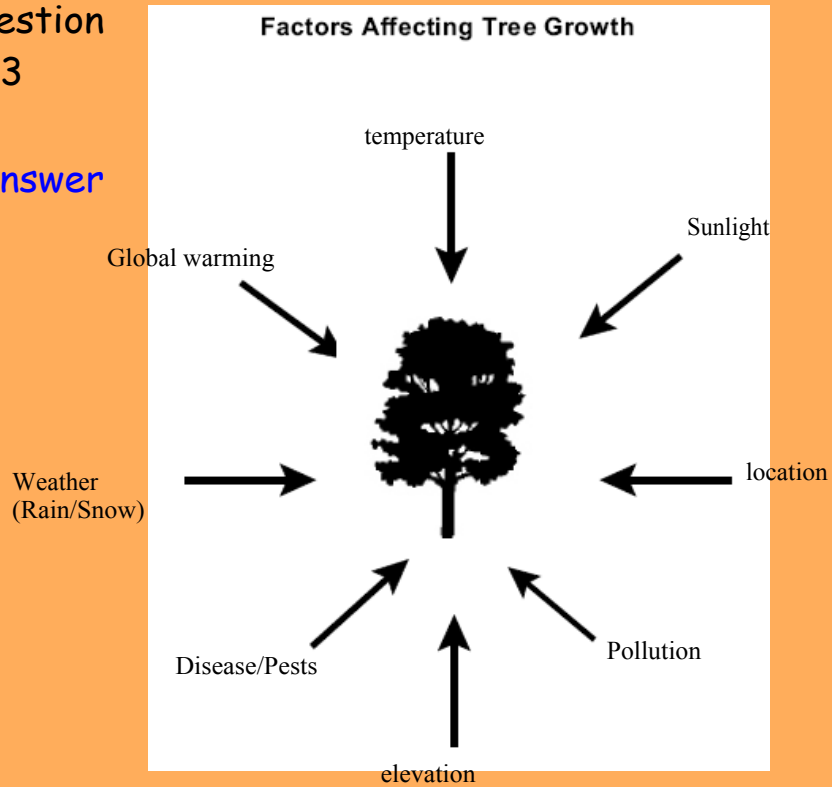
Example: Smoking and Lung Cancer

Focus Question  
Page 3



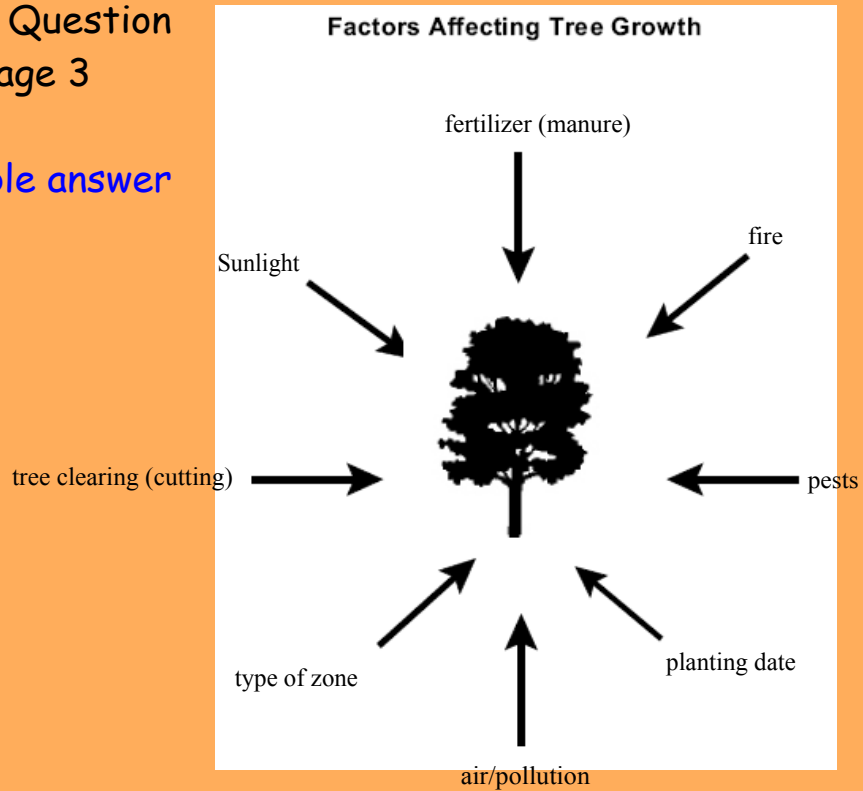
Focus Question  
Page 3

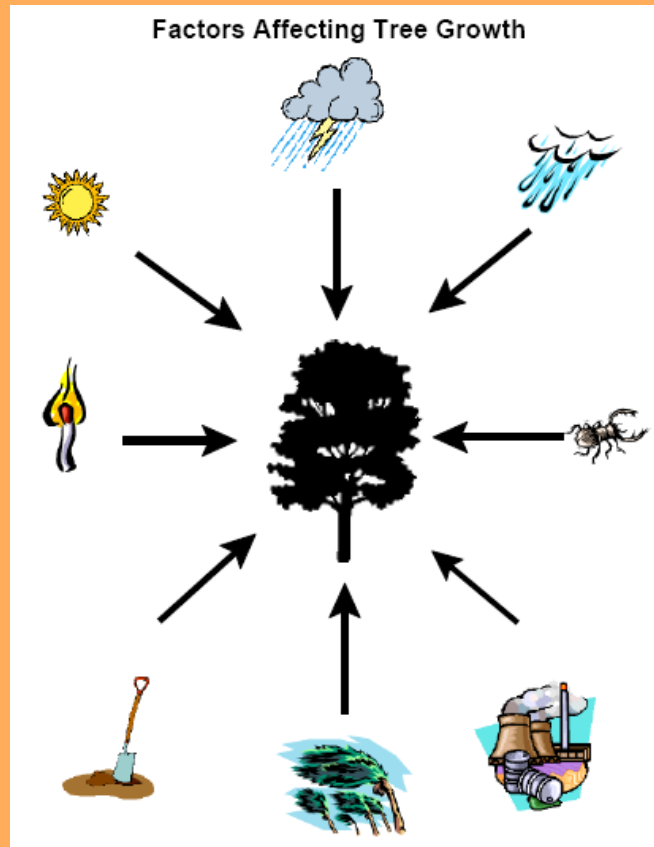
possible answer



Focus Question  
Page 3

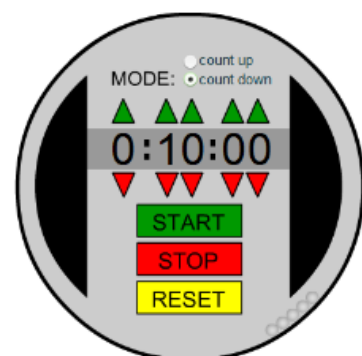
possible answer





**Do Questions Page 3 #2,3**

we will discuss these in 10 minutes  
(if you finish early, read over Pg.4



**Please take out your Homework:**

**Questions Page 3 #2,3**

I will be coming around to check, so  
please have it open at your desk.

2.a) Dependent variables might be (you should have only chose one):

- corn height
- number of corn cobs per stalk
- moisture content
- amount of money earned from corn sold

Independent variables might be:

- rainfall
- type of corn
- distance between rows

2.b) Examples: Distance between rows, type of corn planted

2.c) Example: For moisture content, if the farmer irrigated more, the corn might have a higher moisture content.

### **Question Page 3 #3**

3.a) The distance jumped depends on other variables.

3. b) and c)

<b>Factors influenced by the Designer</b>	<b>Factors influenced by the Skier</b>	<b>Factors Outside the influence of Anyone</b>
<ul style="list-style-type: none"><li>• Ramp length</li><li>• Angle of ramp</li><li>• Amount of artificial snow</li><li>• platform that the skiers jump from</li></ul>	<ul style="list-style-type: none"><li>• Style and make of the skis</li><li>• Wax put on the skis</li><li>• "push" they give at the end of the ramp</li><li>• Position they hold going down the ramp</li></ul>	<ul style="list-style-type: none"><li>• Wind speed and direction</li><li>• Air temperature</li><li>• Ice formed on the ramp</li><li>• Snowfall</li></ul>

3.d) Factors such as ramp length affect the distance jumped but are independent of, or not affected by, the distance jumped.

## Warm-Up

Date:

Identify the Dependent variable in each situation:

1. Amount of time spent studying and the test mark received
2. Your mass and your height
3. Brushing your teeth and cavities
4. Lung cancer and smoking
5. Hours worked and money earned
6. Height and shoe size
7. Gas used and distance traveled
8. Milk consumption and strong bones
9. Health of one's hair and hair products
10. Hours of typing practice and typing speed



When finished, please close your warm-up book, and place in the bin at the front of the class.

## Warm-up

## Answers

Identify the Dependent variable.

1. Amount of time spent studying and the test mark received
2. Your mass and your height
3. Brushing your teeth and cavities
4. Lung cancer and smoking
5. Hours worked and money earned
6. Height and shoe size
7. Gas used and distance traveled
8. Milk consumption and strong bones
9. Health of one's hair and hair products
10. Hours of typing practice and typing speed

10

## NOTES

Focus B, Page 4

- A controlled experiment:
  - all but one variable is held constant so the effect can be studied.
  - only one variable is allowed to change (called the controlled variable)
  - this allows the scientist to know the effect of this variable
- length of time for glue to dry - dependent or independent variable?
- Independent variables:
  - air temperature
  - air movement
  - type of glue
  - size of spot of glue
  - others?
- What is a possible experiment? What is the controlled variable?
  - To design an experiment:
    - needs to be about the dependent variable
    - choose a controlled variable.....one of the independent variables
    - ALL other independent variables need to be kept the same (constant).
    - Write sentences (at least 3) describing all of the above and what you would do in your experiment.
- Would all the independent variables affect the time?
  - All variables would still affect the time, but there effects would remain the same (or constant) throughout the experiment.

## Focus Question #4, Page 4

### Dissolving-sugar experiment

(a) Independent Variable (controlled)	(b) Suggestions for Controlling Factors
Water volume	Increase or decrease
Water temperature	Increase or decrease
Mass of sugar	Increase or decrease
Shape of container	Use different shapes
Water purity	Use distilled and tap water
Amount of stirring	Increase or decrease

4. a) Other Examples: type of sugar (icing, brown, and so on) and whether it is powdered or granular
4. b) Examples: increase the temperature of the water, or stir more vigorously
4. c) These need to be controlled: water vol. and purity, temp. of water, shape of container, type of sugar.

## Classwork

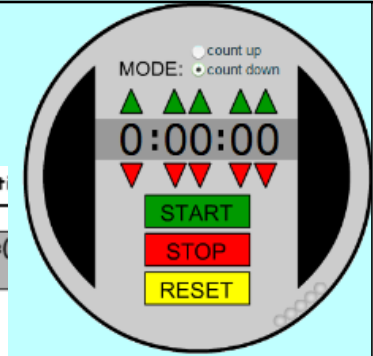
### Do questions Pg.5 #5,6,7

#5

Variables and Relationships (#5, pg 5)

Section

Event	Independent Variable(s)	Dependent Variable(s)
1) The length of a candle and the amount of time it has been burning.		
2) The mark you get on a test and the time you spend studying.		
3) The speed of a car and the distance from the nearest gas station.		
4) The length of a movie and the admission price.		
5) The age of a car and its current value.		
6) The population of a community and its distance from the coast.		



#### Page 5 #6

An apprentice clockmaker is investigating the movement of a pendulum in a grandfather clock. The period ( $\tau$ ) of a pendulum is the time it takes for the pendulum bob to make one complete swing (back and forth).

- List several variables that you think might affect the period.
- List the dependent and independent variables. Describe a set of experiments that you could conduct to find out which of the independent variables affect the period.



White Pine

Price			
Height			

Relationship: \_\_\_\_\_

Scotch Pine

Price			
Height			

Relationship: \_\_\_\_\_

Douglas Fir

Price			
Height			

Relationship: \_\_\_\_\_